DEC 17 1924

AMERICAN
GAS JOURNAL
Established 1850 Pioneer of the Gas Industry

VOL. 121, NO. 27.
WHOLE NO. 3697.

NEW YORK, SATURDAY, DECEMBER 6, 1924

Subscription, $3 Per Year
$4 Canada $5 Foreign

PROFITABLE PROTECTION FOR METERS

A POSITIVE method of insuring permanent protection of meter equipment is to standardize on Lattimer-Stevens Meter Connections.

By practically eliminating meter strain, broken columns and leakage at meter unions, Lattimer-Stevens Meter Connections and Meter Shelves remove the usual causes of most consumer complaints. What this protection means in dollars and cents can easily be estimated from your records of maintenance and complaint costs for any given period.

L-S 450-A—Tie-in Bar Type Connection and Meter Shelf

Lattimer-Stevens Meter Connections are designed and manufactured to provide the maximum in meter protection. They are furnished in both the overlapping bar and tie-in bar types.

Write for samples, prices and Catalog of Meter Connections, Meter Shelves, Stop Cocks and Seals

The LATTIMER-STEVENS COMPANY

72 Yale Ave. Columbus, Ohio

New England Representative
The Eastern Service Co.
Boston, Mass.

New York Representative
Mulcare Engineering Co.
100 Park Place, New York City

Pacific Coast Representative
A. P. Bartley
San Francisco, Cal.

Index to Contents, Page 4

Advertising Index, Page 3

"A STYLE AND SIZE FOR EVERY NEED"

NO matter what your requirements are in the gas cock line we can fill them.

In our most complete and modern line of gas cocks may be found gas cocks for ranges, gas cocks for hot plates, gas cocks for water heaters, and gas cocks for other gas appliances, big and little, tall and short, with stub-nosed nozzles and patent jets; some with porcelain handles, and some with black enamel; made of brass; made to suit U. G. I. specifications and also to comply with A. G. A. specifications; standard and special; all kinds, all styles, all sizes.

Acme
GAS COCKS

ACME BRASS WORKS

8211 Collins Avenue and Belt Line R. R.

DETROIT, MICH.

NEW YORK OFFICE, 150 NASSAU ST.
CHICAGO OFFICE, 79 WEST MONROE ST.

AMERICAN
GAS JOURNAL

Vol. 121. No. 27 NEW YORK, DECEMBER 6, 1924 Whole No. 3497

Industrial Gas at the Crossroads

Effect of business cycles of prosperity and depression

W. M. Carpenter

Engineer, New York City

THE success which has attended the steadily increasing sales of gas for industrial heating purposes and the enthusiasm with which this new business has been sought after have been the outstanding features of the gas industry's history during the past few years.

Up to this summer, when a sudden and unexpected slump took place, few drawbacks have presented themselves to the carrying of the factory heating load—one important reason being that its volume has so far been small in comparison with the total sales of gas.

We have, however, now had a demonstration of several new factors which are introducing themselves with the increase in industrial business. As such loads are progressively added, the gas industry is departing more and more from its traditional, time-honored form, and is becoming increasingly "marginal" and subject to fluctuations which have thus far been of little importance.

The largest influence is that increasing proportions of factory loads will make sales of gas more and more susceptible to the fluctuations of business. This has been the experience of those electric companies which have electrified all industries in their territory and have become, in effect, factory power houses. The electric companies have, however, overcome, to a large extent, the effects of the inevitable cycles of business boom and depression by the adoption of a logical rate structure, which, while by no means solving the whole problem, is a tremendous advance over the old "block" system which formerly prevailed.

The Business Cycle

All action is accompanied by reaction, in business as well as in mechanics. Nothing is stable, and all human endeavor is in a constant state of ebb and flow, controlled by many factors which, however, ultimately tend to balance each other. Generally speaking, there are first the great national swings of boom and "hard times"; of high tides of prosperity, followed by equally serious depressions. On top of these are secondary variations, due to local influences; small waves upon the great world-wide tides. Superimposed upon all are still smaller variations, comparable to the ripples on the waves.

Making Business Forecasts

The period, magnitude and extent of none of these can be forecasted with even a semblance of accuracy. Business does not move with the regular rhythm of the ocean from high to low and back again or with the regularity of the "blow" and "run" of the water-gas machine. Some depressions have been of long, others have been of short duration. The success of various crops, wars and rumors of wars, conditions in foreign lands, are fundamental factors which no man can accurately predict. At the same time these cycles do occur; they have taken place in the past with startling persistence and we have had at least eight of them since the Civil War. They are occurring today; the backwash of the Great War helps to accentuate the ebb and flow of business fortune —as witness the "disturbances" of the past six months.

Relation With Industrial Gas

How, then, does all this affect industrial gas? Sales of gas for factory use are proportional to the magnitude of factory operation, which, in turn, is de-

pendent upon the state of business activity. When business is dull, sales are low; when business booms, sales are great. The capacity of the gas-making and distributing facilities, however, are fixed; and they are determined by the demand of the boom years. Fixed charges, interest, amortization and, to a large extent, depreciation, are determined by plant

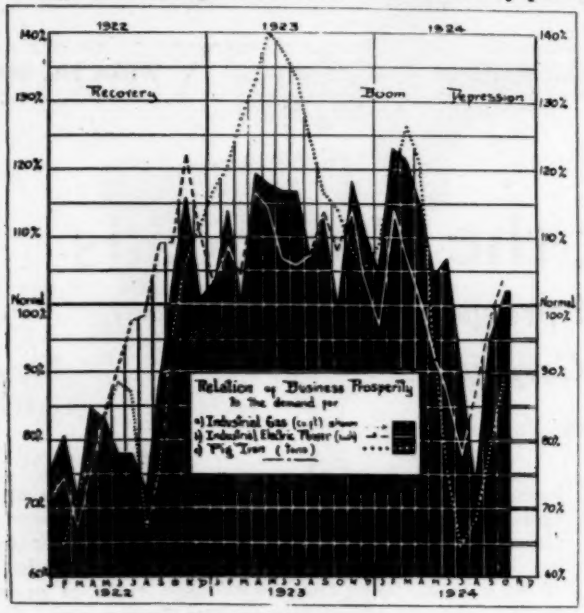


Figure 1. Pig Iron Curve

(This chart shows the ratio of the output of pig iron, and the sales of industrial gas and electric power, per working day for the various months, to the three-year average. The gas and electricity are shown for a constant connected load in the large industrial area of Central New York State. Pig iron production covers the entire United States.)

capacity; and interest goes serenely on, whether business is good or bad. It is the function of a correct rate structure to equalize as far as possible these unavoidable fluctuations and to prevent the years of depression from causing frequent rate changes or else the absorption of serious losses either by the consumer or by the gas company.

The Pig Iron Curve

Figure 1 shows the ups and downs of fortune during the past three years, as shown by the production of pig iron in the United States and the sales of electric power and of industrial gas in the large industrial district of Central New York. The pig iron curve is the ratio between the average daily production and the three-year average, worked out along the lines suggested by Col. Leonard P. Ayres, of the Cleveland Trust Company, in his classic study of pig iron as an index of business prosperity. The sales of gas in cubic feet and of electricity in kilowatt hours have been reduced to a constant connected load for the three years, and are, similarly, the ratio of the daily average to the three-year one. Note the uncanny parallelism of the three curves, especially between those of industrial gas and electric power. Except for the high peak of pig iron in the middle of 1923, when the steel industry "broke loose" and paid merrily for it a year later, the curves are practically identical.

Bituminous Coal and Industrial Gas

Similar tendencies are shown by the production of that commodity which industrial gas will ultimately largely supplant—bituminous coal. Figure 2 shows the same type of chart for soft coal production in the United States, with the industrial gas curve of Figure 1 included. We have been accustomed to look upon coal mining as the outstanding example of "marginal" and intermittent operation in a saturated field; but, after all, except for the effects of strikes and of strike scares, the ups and downs of coal operation have not been much different from the swings of ordinary business prosperity. Indeed, for the last two years, they have not been as wild as those of industrial gas. Note the coincidence of the curves of gas and coal when allowance has been made for the few months' "lag" in the former.

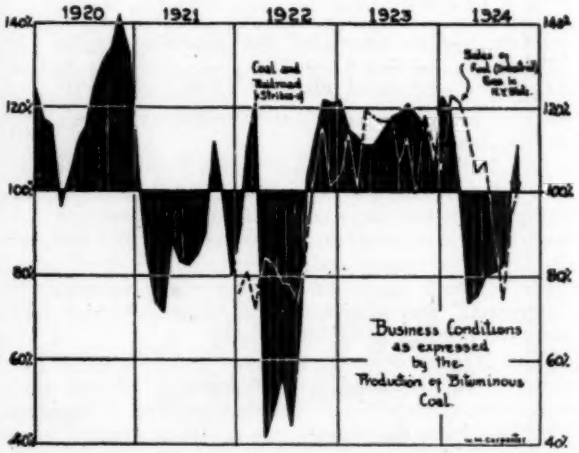


Fig. 2. The Ups and Downs of Bituminous Coal

(This chart is prepared by dividing the average actual production per working day by the five-year average [1,530,000 tons]. Except for the effects of strikes, this curve is remarkably similar to that of general business conditions in this country.)

Will these swings continue; or will they, as our favorite optimists predict, settle down to a quiet level of uninterrupted prosperity? It would be

(Continued on page 1255)

GAS MERCHANDISING

Domestic – Industrial

Gas Heaters and Ranges for Xmas

A few display suggestions of value

W. B. Stoddard

THERE is nothing which radiates greater cheer than a gas heater or insures more comfort than a gas range, and it seems particularly desirable, therefore, that they should be featured as Christmas gifts, which is the season when cheer and comfort are the dominating features.

The gas company will, accordingly, do well to follow the example of leading lights in the business and headlight these stoves. An excellent piece of copy was that of the New Orleans Gas Co., which said:

THE IDEAL CHRISTMAS GIFT
for
MOTHER — WIFE — SISTER

It's a gift she will appreciate 365 days in the year, for many years to come—a gift that will make the home more cheerful; one which gives a constant source of pleasure; one which will give delight through its usefulness and labor saving.

A GAS RANGE

is the Christmas gift which will most delight the housekeeper's heart. It is the gift which will give pleasure day in and out. A dozen styles of gas ranges and many other useful and practical presents can be seen at the New Orleans Gas Co.'s salesrooms.

Appeal to the Old Customer

But it is not only the housewives who have not previously possessed gas ranges to whom an appeal should be made. "The big idea," said the manager of the Milwaukee Gas Light Co., Milwaukee, Wis., "is to get equipment out of service which makes it impossible for the consumer to get first-class service. The best gas in the world is handicapped if it is burned in obsolete equipment and no amount of explanation will make the customer satisfied. A new range, with lighter, heat control, enamel panels, etc., makes a booster for gas, whereas an old-time gas stove is a constant source of friction between the company and the consumer. Accordingly, we seized on the pre-holiday season as the best to start a campaign for modern equipment.

"We accordingly sent out with our monthly gas bills a special offer of an allowance of $10 for any old gas stove if a new cabinet range was purchased. The offer—which was also announced in the newspapers and by cards in the windows—brought in 160 of the veterans. A few of them we placed in our windows, as horrible examples, alongside some of our modern equipment, while most of them went at once to the junk heap. Many of the stoves brought in were twenty years old—and looked it. In probability the ovens were not used at all, as most of them were badly rusted. The top burners probably saw some service, but gave it very inefficiently. Most of those buying new ranges purchased enameled ones, and the majority paid cash and took the 5 per cent discount. The kitchens thus equipped with new ranges were, we venture to say, the show places of the house during the holiday season."

Pushing Gas Heaters

In the milder climates, particularly, the gas heaters find a ready sale in the winter, while in the colder climes they are welcomed in the spring and fall for taking off the chill of a room. The Beacon Gas Co., Los Angeles, Calif., played them up as Christmas gifts, taking a full page advertisement to bring them to the attention of the public. The upper portion showed a happy family gathered about a reading lamp on the table, with the junior and a big cat basking in the rays of a radiant fire. Along the sides of the advertisement different models of these gas heaters were shown. Their selling argument was extremely effective:

GAS HEATERS

Bring Warmth and Good Cheer to Your Home for the Holidays

The full enjoyment of the holiday season requires a home that is well heated, a home that can instantly be flooded with clean, wholesome, cheery warmth. Make your home such a one by installing a gas heater.

With marvelous efficiency the burners heat

(Continued on page 1253)

*Labor-Saving Equipment

Description of apparatus used in distribution work

A. M. Boyd

Engineer Gas Distribution, The U. G. I. Contracting Company, Philadelphia, Pa.

A GENERATION ago labor was both cheap and plentiful; consequently there was little, if any, incentive to replace hand operations with mechanical equipments.

The change to present conditions of high priced and limited supply of labor has been a somewhat gradual one, hastened by the war, and made probably permanent by our country's attitude on immigration.

Under present conditions there is a great opportunity, not only for equipment that will operate more economically than hand labor, but also for equipment that will accomplish a given task efficiently and replace labor, even though the actual operating saving shown is negligible.

Early Stages of Development

In the earlier stages of development manufacturers of labor-saving equipment made very exaggerated claims for economies, some of which were impossible of realization if proper charges were made against the equipment, and consideration given to its limited opportunity for use.

Pioneer gas companies purchased equipments expecting to find adaptability for their work, and also economy, and in many cases found neither. These early experiences made gas companies very conservative in adopting labor-saving equipment for their work, even after it was apparently being used with success by contractors doing work of similar nature.

Our neighbors in the Middle West section were perhaps less conservative than in any part of the country, and this fact, together with the greater difficulty in obtaining labor, caused them to experiment earlier with equipments of various kinds.

At the present time, trenching machines, backfillers, tampers, caterpillar and truck cranes and compressor outfits are in much more general use in the West than they are in the East. This condition is not without an explanation, and that explanation is that, generally speaking, the middle western section of our country is ideal in all conditions for the use of mechanical equipment.

Why Labor-Saving Machines Are Used More in West

For the trenching machines, the soil is in most cases ideal; the streets are wide and the development of suburban territory is extensive.

The policy of puddling ditches with water makes the use of backfillers, operating with a drag line and scraper, a very efficient and economical operation.

The wider streets make possible the use of cranes without serious inconvenience to traffic, and the great amount of improved paving provides opportunity for the pneumatic tools operated from compressor equipments.

I have observed the operation of various kinds of equipment in the West under ideal conditions, and am familiar with the generally totally different conditions of the eastern section of the Middle Atlantic States. I appreciate the difference, but am of the opinion that eastern gas companies have not generally availed themselves of their opportunities for the use of mechanical equipment that will replace labor.

Conditions Surrounding Construction Work

Gas companies' construction work must usually be carried on in this climate for about ten months in the year. The first and last part of this working season is not always an ideal time for construction, but the work must be commenced early and continued late in order to provide the necessary extensions for building operations. The organization is limited usually, and in many instances the necessary mains cannot be laid with the degree of promptness that would keep them always in advance of the completion of the houses.

Labor-saving equipment would, in my estimation, do much to speed up the work and shorten the season for distribution construction work.

Several large companies, with which I am familiar, where there are ideal conditions for the use of mechanical equipment, have a dispatcher in charge of these outfits, and they are moved from job to job in the territory in much the same way as are trucks delivering material.

A trenching machine is ordered by a gang foreman for a location where a main extension is to be made. This order is given in sufficient time to permit the machine supervisor to route this job for a machine with an operator so that the trench will be open and ready for the foreman and pipe gang to start laying main as soon as they arrive on the work.

A similar order is given for a backfiller or scoop, which is sent to take care of the refilling.

(Continued on page 1251)

*Read at the mid-year meeting of the Pennsylvania Gas Association, in Reading, Pa., December 4, 1924.

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 48

Change of State *(continued)*

The Mechanical Equivalent of Heat

It is now understood that the calorie or the British Thermal Unit is the absolute unit of heat, a unit which, for all intents and purposes, is independent of the temperature. It is a unit which is comparable with the kilowatt, as measuring electrical energy and the foot pound or horse-power, as measuring mechanical energy.

In one of the early lessons of this series it was brought out that heat is a form of energy and that other forms of energy, such as electrical and mechanical, may be converted into heat energy. Similarly it is possible in certain ways to convert heat energy into electrical or mechanical energy, although the change is not as direct as in the former case. If such transformation is possible, it is natural to suppose that there must be some definite relation between the units of electrical and mechanical energy and that of heat energy. It is important in certain instances for the gas engineer to understand this relationship.

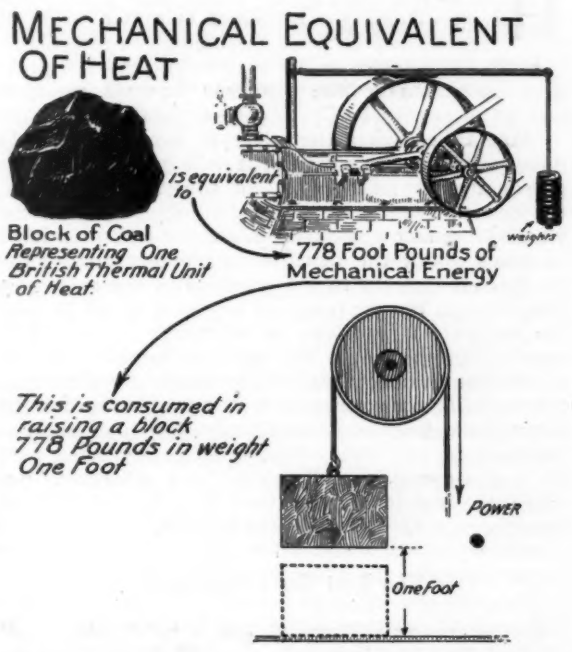
Determination of the Unit

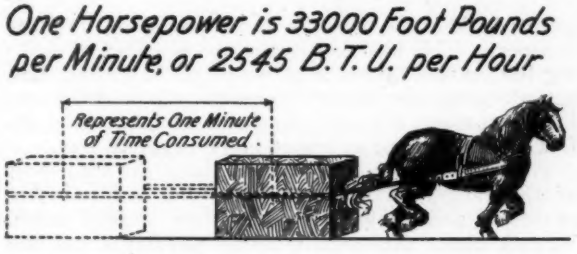
The mechanical equivalent of heat is just another way of wording the relation that exists between the calorie or British Thermal Unit and the foot pound or horse-power. There are a great many different ways in which this numerical relationship can be established and it is natural to find that the values that are obtained by the application of these methods do not by any means agree with one another. The general method of experimentation is to consume a certain amount of mechanical energy and measure the heating effect produced thereby.

The generally accepted value of the mechanical equivalent of heat is 778 foot pounds. This means that one British Thermal Unit of heat will be generated by the consumption of mechanical energy, 778 foot pounds in magnitude. A foot pound is simply the energy necessary to move one pound in weight through one foot of space. A horse-power is a rate of doing work, in other words, 33,000 foot pounds per minute. This is equal to 2545 B.t.u. per hour or 42.416 B.t.u. per minute. Thus if the mechanical energy equivalent to one horse-power was converted into heat, there would be generated 42.416 B.t.u.

The Significance of Specific Heat

It has been said that specific heat is an inherent property of matter. Each kind of matter, whether it be gaseous, liquid or solid, possesses its own characteristic specific heat, which marks it out from all others. Specific heat is not a constant


MECHANICAL EQUIVALENT OF HEAT
is equivalent to
Block of Coal
Representing One British Thermal Unit of Heat
778 Foot Pounds of Mechanical Energy
This is consumed in raising a block 778 Pounds in weight One Foot
POWER
One Foot



property, as it varies with the temperature, but for technical purposes it can be considered as constant for any substance as long as the latter does not change its state. In other words, the specific heat of tin is 0.0562 as long as the metal remains in the solid condition; once it changes its condition and becomes liquid, it acquires another specific heat, in this case 0.0637. The same behaviour is common to most materials.

Aids in Selling Ranges

A few suggestions that will interest gas salesmen

Frank H. Williams

HERE are some points which have been found by various gas appliance salesmen to be of great help to them in selling gas ranges:

First—Never use as an argument that the prospect should make the purchase because the sale will be of personal help to the salesman.

Many times, when the salesman says: "I certainly hope you'll buy this range; it will be a help to me personally, if you'll do so," or something like that, the prospect turns against the salesman and the whole proposition at once. When the salesman talks so much about the benefits to him personally, the prospect is inclined to get incensed at the salesman. Why should the prospect do anything at all to help the salesman? Just because whenever the salesman says something about the personal benefits to him in the transaction, it makes the prospect realize that there will be a commission in the proposition for the salesman and no prospect likes to feel that some of the hard-earned money that is ostensibly being paid for a gas range is really going to a salesman. So, when the salesman puts such a personal element into the sale he merely hurts himself.

The Best None Too Good

Second—In selling gas ranges, always take it for granted that the prospect is accustomed to having the latest and best things in the home. Take it for granted that the best is none too good for the prospect. This has the psychological effect of making the prospect want to prove to the salesman that, actually, only the best of everything is to be found in the prospect's home. And this will have the effect of making the prospect more eager to buy.

Third—Do not talk too much about the total cost of the range. Talk more about the low monthly payments and the small amount that is asked down. To talk about the small monthly payments and the small down payment is to have the effect of making it seem as though the cost of the range is really very small, whereas if the total cost of the range is emphasized the sum is apt to look insurmountable to many folks.

Fourth—If the prospect starts talking about the range being operated differently from the one to which she is accustomed, show her at once that the difference is more apparent than real, and that, actually, the difference is merely an improvement on what she has always been accustomed to. Show her that with the new range it will be easier for her to do the same old things in the same old way to which she has always been accustomed.

The Gas Consumption

Fifth—Keep away from the question of gas consumption unless the customer brings up the point, and then be prepared to present figures to the customer showing the exact experiences of various people who own similar ranges. The more definite and specific such figures are, the more the customer will be interested and the bigger help they will be in putting sales across.

Sixth—Never say, "My wife does thus and so with a range just like this." To make such a statement is to make some customers feel that the proposition in question is quite a feat and the salesman's wife was successful in accomplishing the feat only after great effort. It is much better to tell about the experiences of some person who is not any relation to anyone in the gas company and who has done the thing in question with the same sort of a range as the prospect is considering purchasing. When this is done, the customer always feels that the statement must be well founded on facts. For when the salesman gives the customer the name and address of some range owner who is said to have done a certain thing in a certain way, the customer can, of course, check up on the proposition by calling up the person in question. Consequently, such statements relating to the experiences of range owners are always decidedly impressive on most prospects and are always quite helpful to the salesman in making sales.

All of which, it is hoped, will offer some worthwhile ideas and suggestions to salesmen which will be of aid to them in selling more ranges.

As The Journal Views It

THE CATALOGUE QUESTIONNAIRE

We have received several hundred replies to our questionnaire regarding data page material for the 1925 edition of the American Gas Catalogue.

Many very valuable suggestions have been received and the data material in the 1925 edition will include practically all of the suggestions made to us.

We use this means of thanking all those who have returned the questionnaire and those that will follow, for their co-operation in helping us to make these data material pages of greatest value to the greatest number of men actively engaged in the management and operation of the various departments of the gas company and gas works.

MERCHANDISING AT A PROFIT

The commercial manager of many a gas company has had to cope with a merchandising problem that is perhaps one of the most difficult to solve that he can be concerned with. Some have been so fortunate as to have been able to arrive at a solution without very much difficulty. Others perhaps have not yet come in contact with it, because of special local conditions, and still others are at the present time doing their utmost to obtain a happy solution of the difficulty. To all, the matter is of prime importance. What we refer to is, in fine, whether or not the merchandising department of a gas company should be conducted at a profit.

This simply means, should the merchandise in the form of gas appliances that is sold by the gas company, by that part of its organization that is particularly concerned with this phase of the gas business, be sold at such prices that this department can be run at a profit, or should the merchandise be sold either at a loss or with no gain at all to the gas company.

The matter is not quite so simple as it seems. To the uninitiated the first answer would be: Why, of course, run the department at a profit; how else can any business be conducted? One reason why this problem possesses difficulties all of its own is because gas company executives have been accustomed to consider their business as being primarily concerned with the sale of gas, and only incidentally with the sale of appliances and equipment in which gas is used.

This is, of course, true enough, when viewed from certain angles, but it is just as true that the gas company's business is also to sell appliances; in fact, it has to sell appliances whether it wants to or not. For it generally finds that, if it does not, appliances are then sold to the customers of the gas companies by unreliable concerns or by people who do not understand gas appliances, with the result that poorly designed and inefficient equipment gets into the home and the factory and creates all kinds of troubles and difficulties.

In fact, one of the greatest problems that the gas company has to contend with—and this refers to every gas company in the country—is the sale of gas appliances to its customers by business houses which do not understand what they sell, and, furthermore, who are not very much concerned whether they do or not. The unfortunate part of the entire problem is that the whole burden of a poorly operating appliance is felt by the gas company, for the customer seldom, if ever, stops to consider that the trouble may not be with gas at all, but may rest in the cheap appliance he bought at some second-hand establishment or at a sale in a department store, where this particular grade of appliance was recommended because a little more profit was made in selling it.

The customer does not stop to analyze the situation, but immediately blames the gas company for his trouble and starts for the gas company's office, hot-footed with his tale of woe. The result is that it takes quite considerable explanation—and sometimes no explanation will avail—to make the wrathful customer understand that he himself is to blame because he purchased a poor appliance at low price, no matter what fuel he used in it.

It is essential to impress upon him by all means that gas is not to blame, that the fuel is perfect, but that it must be used in a properly designed machine

before it can give the results that are expected of it.

It is just because of the danger of these cheap appliances getting into the homes of the customers and being sold to them by merchants who do not understand what they are selling, that the gas company's merchandising department must be run at a profit. For if the price of the appliance in the gas company's salesrooms is too small the result will simply be that the merchants in town who are also interested in the sale of gas equipment will have to look for still cheaper water heaters, cheaper ranges, space heaters, etc., to sell in order to compete with the gas company.

This is the condition that confronts the merchandising department of the average gas company. The department stores and others who are engaged in the sale of appliances all the time will compete with the gas company in the sale of gas appliances, no matter how the merchandising department of the gas company is run, but the main point and principle is that, when this department is not run at a profit, then the chances of poorly designed and poorly operated gas appliances getting into customers' homes are much better than otherwise.

The gas company must look out for its own interests. It must take all steps possible to see that the apparatus, which is used in the home and in the factory for the burning of gas, is of such nature that it gives good results. It must do its utmost to teach the people to understand that it is far better to spend a little more money for a more expensive gas appliance which has been designed to give efficient results than to buy a cheap appliance which may save them a little at the outset, but from which they can gain little comfort and satisfaction.

This is the problem that faces the merchandising department of every gas company. It is a problem that cannot be solved at a moment's notice, but requires considerable study. Generally it has been found that a happy medium can be reached and a plan evolved by which the merchandising department of the gas company may make a reasonable profit, which should be large enough to discourage the sale of poor appliances by other merchandisers.

The problem is yet to be satisfactorily solved, and perhaps it will reach a satisfactory conclusion when appliances are tested by an official laboratory and sold with a testimonial from that laboratory and the consuming public is educated to understand that nothing but such a tested and approved appliance should be allowed in their homes unless they welcome inefficiency, if not actual danger. But before this condition can be obtained it may well be taken that the operation of a merchandise department of the gas company at a profit will help to eliminate in part the introduction of cheap, poorly designed, inefficient and dangerous gas appliances in the home and in the factory.

THE FUTURE IS SAFE

Dr. E. R. Weidlein, director of the Mellon Institute for Industrial Research, told members of the American Gas Association recently that there was no need for alarm over the possible depletion of our known storehouses of fuel and energy, but that science was rapidly developing new sources which would be utilized long before present supplies were exhausted.

Natural gas will soon be higher priced and will be utilized for far more valuable purposes than it is being used today, Dr. Weidlein predicted.

"There has been spent in the last two years something over six million dollars in plant equipment for the utilization of natural gas in an entirely different way," he stated. "It is going to be made the basis of one of our great organic chemical industries."

The manufactured gas industry, which is redeeming the by-products and essential values of raw coal, offers innumerable opportunities for research work, because, Dr. Weidlein said, "whenever we discover and utilize one particular by-product we have hundreds of other by-products as a result of that particular investigation which require further investigation and utilization.

"It has been estimated that the contribution of the research laboratories in America at the present time is creating a half billion of dollars a year in new wealth. Materials that were formerly cast aside as waste are now being utilized. The productive capacity of the nation is greatly increased.

"Scientists are not nearly so much concerned with the statements of alarmists that the world is being impoverished and posterity embarrassed by the enormous consumption of our fuels, coal and petroleum. We feel that we will not long be handicapped, because of our knowledge already gained into energy changes of reacting chemicals and also the possibility of obtaining our motive fuel from sources not now utilized, and we are quite certain that these will be developed long before our present sources are exhausted.

"The great wastes formerly permitted in the coal-tar by-product field, which is closely related to the gas industry, are now being checked and it has made it possible for us to be independent of foreign fields in our dye industry.

"You cannot separate the gas business from scientific research, because the gas business is developing on a scientific basis and depends upon the two fundamentals: chemistry and physics. The chemist is protecting you whether or not you yourself are interested in trying to develop new sources of material."

Catechism of Central Station Gas Engineering in the United States

Installment No. 48.

(Continued from last week)

Construction of Flat Flame Burners

253. What details of construction have been adopted in the manufacture of flat flame burners in order to insure that the combustion of the gas shall take place as far as possible under the conditions stated in the answer to question No. 252?

Ans. The following details of construction have been adopted to put into effect the principles brought out in answer to question No. 252. To insure the exisence of a low pressure at the burner tip the improved forms of flat flame burners are provided either with some form of governor, which maintains the pressure at the tip constantly at the proper point, no matter how much the pressure on the piping increases, or else with a "check," which is usually a metal, steatite or lava disc inserted in the burner pillar so as to cut off any flow of gas to the tip, except through a hole in the disc, the area of which is smaller than that of the opening in the tip, the relation between the area of the opening in the check and that of the opening in the tip varying with the pressure at which the burner is designed to be used; that is, the higher the pressure the smaller the hole in the check for the same sized tip.

In order to maintain the temperature of the flame at as high a point as possible, the burner tip should be made of a non-conducting substance, since if made of metal or any other good conductor of heat, the heat which is absorbed and carried away by the tip reduces the temperature of the flame. In all of the best forms of flat flame burners the tips are now made of either lava, steatite or enamel, all of which are poor conductors of heat.

Producing Steady Flow of Gas

To produce a steady, even flow of gas without any swirling motion some burners have placed between the check and the tip a screen of fine wire gauze which breaks up any currents, and renders the flow of gas uniform throughout the whole area of the burner pillar, while others depend upon the steadying action produced by the large area of the burner pillar above the check as compared with the area of the opening in the tip.

To secure an equal supply of gas to all parts of the flame, slit (batswing) burners are made with what is called a hollow top, by means of which the slit is kept of the same depth in all parts instead of being much thicker at the top than at the sides, as it would necessarily be if the top of the tip were left solid instead of being hollowed out inside to conform with its shape outside. The effect of extra thickness at any place is that less gas passes through the slit at the thick place, and that consequently the conditions are not the same at all parts of the flame. A further improvement in this direction, introduced in some burners, consists in cutting the slit with a circular saw applied from above the tip and thus making it curved on the bottom instead of flat, as is the case when it is cut by sawing in the ordinary way. With the flat bottom slit some of the gas issues at right angles to the axis of the burner, only to be folded back on the upper part of the flame by the upward draft of air caused by the heat of the flame, while with a curved bottom slit this effect is avoided as the gas issues in a direction along which it is free to travel without being turned aside, and the flame is thus kept of more even thickness throughout.

In Sugg's table top burners the effect of the upward rush of air in increasing the thickness of the lower edges of the flame is still further guarded against by forming a circular "table" immediately under the top of the tip, the projection of which deflects the currents of air and prevents them from rising vertically against the flame.

Types of Flat Flame Burners

254. Flat flame burners are of two kinds, known respectively as fishtail and batswing burners. Give a description of each kind, and state which will give the greatest amount of light from a given illuminating gas, the gas being consumed under the proper conditions to give the best results in each case.

Ans. Fishtail and batswing burners differ in the form of the tip and of the orifices in the tip from which the gas issues.

In the fishtail burner the top of the tip is usually concave, though in the poorer forms the tip has a flat top. The gas issues from the tip through two circular orifices set opposite each other. The axes of these orifices are set at an angle with each other so that the jets of gas meet, and by the force of their impact are spread out into a sheet of flame in a plane midway between the orifices and at right angles to the line drawn through their centers. The shape of the flame produced by a fishtail burner is affected by the angle between the axes of the orifices through the tip, a very acute angle producing a long and narrow flame which is widened and shortened as the angle is made more and more obtuse. The determination of the angle at which the greatest illuminating power per cubic foot of gas is produced is an important point in the design of a fishtail burner, as is also that of the proper size of orifice, since to secure the maximum results it is

necessary to use different angles and sizes of orifice with different qualities of gas.

The tip of the batswing burner has a dome-shape top, varying from a hemisphere, or even a shape approximately ¾ of a sphere, to a very flat dome. The gas issues through a single orifice, which is a long narrow slit cut through the top of the dome to its lower edge and at right angles to its base. The gas issues from this slit in a sheet, the thickness of which is varied to suit the quality of the gas to be consumed, being thin for rich gases and thick for poor gases. There is little difference at present between the shape of the flame produced by the fishtail and batswing burners respectively, although as they were first designed the fishtail burner gave a long narrow forked flame and the batswing a short broad flame, whence the names.

Since it is necessary that the two circular jets in which the gas issues from a fishtail burner should come together with considerable velocity if the gas is to be well spread out and a good flame produced, this form of burner requires a higher pressure at the tip than is needed with a batswing burner, and consequently the latter as a rule yields more light per cubic foot of gas than does the former when both are being worked under the proper conditions for the attainment of the best results. The fishtail burner is, however, much less apt to stop up than the batswing, and for this reason is given the preference by most gas companies, if any trouble is experienced from burner stoppages.

Effect of Pressure on Gas Flame

255. What is the effect of excessive pressure upon the illuminating power of gas burned in an ordinary flat flame burner, and why does it produce this effect?

Ans. When gas burned in an ordinary flat flame burner issues from the tip at an excessive pressure its illuminating value is reduced much below that which can be obtained when the same quantity of the same gas is consumed at a lower pressure, in fact, with high pressure at the tip the luminosity may be entirely destroyed. This effect is more marked the thinner the flame. It is due to a more rapid mixing of air and gas in the case of the high pressures owing to the greater suction exerted upon the surrounding air since the gas issues from the tip at higher velocities. This rapidity of mixture acts in two ways in destroying the luminosity of the flame. The first effect is to consume more of the hydrocarbons contained in the gas before they are decomposed by the heat of the flame and thus to prevent the formation of the carbon particles to which luminosity is due. The second effect is to cool the flame by the drawing in of an excess of air and by this cooling to retard the decomposition of the hydrocarbons so that still more of them are consumed before being decomposed, and to reduce the temperature to which such carbon particles as are formed can be heated, and in this way further decrease the amount of light given by the flame. This cooling and diluting effect becomes of greater importance as the pressure increases, until with a sufficiently high pressure the flame is entirely extinguished by the cooling effect of the excess of air drawn in and mixed with the gas.

The Argand Burner

256. Describe an Argand burner and state how it compares in efficiency from a light-giving standpoint with flat flame burners.

Ans. The Argand burner is a luminous flame burner in which the gas is burned in an annular flame with separate air supplies for the interior and the exterior surfaces of the flame. The flame is surrounded by a glass chimney. The burner tip is in the form of a hollow cylindrical annulus with a round top which is perforated with a number of small circular holes spaced so closely together that the jets of gas issuing from them coalesce into a solid ring of flame. In the best form of Argands this tip is formed of steatite, or some similar substance, which has the advantages over metal of being a non-conductor of heat and of not being subject to corrosion, and therefore allows the attainment of a higher flame temperature and of a longer life for the burner than is possible with a metal tip. In the center of the interior air opening is placed a narrow metal spike, like a piece of very thick wire, the object of which is to steady the interior air current and give it a direction of travel parallel to that of the gas. The external air supply is divided into two parts by the use of a frustrum of a hollow cone made of metal which surrounds the tip for its full height. The largest portion of the air supply for the exterior of the flame comes into the chimney on the inside of this cone, and is directed by it upon the base of the flame, but as the bottom of the cone does not reach quite to the base of the chimney another portion of this air supply enters between the cone and the chimney and ascends next the chimney to supply the upper part of the flame. The gas is supplied to the gas chamber in the tip by three small supply pipes spaced at equal distances around the circle, the combined area of the openings in these pipes being less than that of the opening in the fixture on which the burner is screwed. The number of holes in the tip may be varied, so long as their size is kept such as is suitable to the quality of the gas to be consumed, and their combined area is larger than that of the openings in the pipes through which the gas reaches the tip.

Draft in Chimney

The draft of the chimney used with an Argand burner furnishes a motive force by which the air required for combustion is drawn into the flame and the gas is not required to exert any injector action to accomplish this object, nor is it necessary to have any great velocity of exit from the burner orifice to give the proper shape to the flame. It is therefore

possible to have the gas flow from the holes in an Argand burner at practically no pressure, and since the air supply can be very closely regulated by varying the height and size of the chimney used, it is possible to secure very good conditions for luminous combustion in an Argand burner, and consequently these burners give much better illuminating power results from the grades of gas for which they are designed than do the flat flame burners. They are made principally for use with gas with an illuminating value of under 20 candles, and when the gas has a candle power greater than this, the Argands in common use are not fitted for its consumption and do not give any better results than, or even as good results as, good flat flame burners, although if Argand burners were made especially for such gas there is no reason why the results should not be relatively as good as those obtained with the gas of lower grades.

Advantages of Pressure Regulators

257. State two or more conditions making the use of pressure regulators on house piping, or of governor burners, of advantage.

Ans. First. A wide variation in the pressure at the meter, such as will be found on feed mains running from the works, or holder stations, to different parts of the district supplied. This variation is due to the necessity of carrying on these mains a much higher pressure, at the times of maximum demand, than is required at the times of smaller demand, in order to keep up the pressure at far-away points.

Second. A pressure at the burner higher than is consistent with the economical use of gas, such as will be found at the higher points of very hilly districts.

Where these conditions exist, and especially where the one first mentioned is found, it is very difficult to get satisfactory results from gas burners, particularly if they are incandescent burners, without the use of a pressure regulator at the outlet of the meter or of governors on the burners.

The Bunsen Flame

258. What is meant by the expression "an atmospheric (Bunsen) flame"?

Ans. An atmospheric or Bunsen flame is the non-luminous and blue flame produced by the combustion of gas which has been mixed with air previous to its combustion.

259. What is a Bunsen or atmospheric burner?

Ans. A Bunsen or atmospheric burner is a burner arranged so as to mix air with the gas before ignition takes place. The mixture of air and gas is effected in a mixing tube, or chamber, into which the gas enters through a comparatively small opening the jet so produced acting in a manner similar to the steam jet in an injector, and drawing in air through openings provided for this purpose. The mixture thus made is ignited at the end of the tube and burns with a non-luminous flame. Bunsen burners are principally used for heating purposes and in connection with incandescent gas lighting.

Non-Luminosity of Bunsen Flame

260. Why is the flame of a Bunsen or atmospheric burner non-luminous?

Ans. The flame of a Bunsen or atmospheric burner is non-luminous because such flame contains none of the carbon particles, the raising of which to incandescence furnishes the greater part of the light produced by a luminous flame, as is explained in the answer to question No. 251. This absence of carbon particles from the atmospheric flame is considered to be due to the chemical activity of the oxygen mixed with the gas before combustion in burning up the hydrocarbons before they can be decomposed; to the diluting effect of the nitrogen which raises the temperature that must be reached before the hydrocarbons decompose; and also to the cooling effect of the air, which acts in the same way as the diluting effect and adds to the general result, although when the proportion of air to gas is high, above 3 to 1, the cooling is less than the increase in temperature due to more rapid oxidation. "In an ordinary atmospheric flame the nitrogen and oxygen are of about equal importance in bringing about the loss of luminosity, but if the quantity of air be increased the oxidation becomes the principal factor and the nitrogen practically ceases to exert any influence."

Cause of "Light Back"

261. What causes an atmospheric burner to "light back," and to what is due the odor given off when this occurs?

Ans. An atmospheric burner "lights back" whenever the speed with which the mixture of air and gas travels through the tube is slower than that at which a flame can spread through the mixture. Anything which decreases the rate of flow of the mixture of air and gas, or which increases the speed at which the flame can spread, will, therefore, tend to produce lighting back.

Some of the causes of a slow speed of the air and gas mixture are a large tube area, the issuing of the gas from the gas orifice at a low velocity because of being under a low pressure, and any draught or concussion of the air that creates a pressure at the point of ignition. The rapidity with which the flame can be propagated back through the mixture depends upon the proportion in which air and gas are present, being greater the more nearly the amount of air present approaches to that required for the complete combustion of the gas. Lighting back may therefore be brought about by the gas being at too low a pressure, by a draught, or a sudden wave of air, such as that produced by the violent closing of a door, or by poor design in the burner, either in the way of providing too large a tube or of permitting the drawing in of too much air for the amount of gas used.

When lighting back occurs the gas burns as it issues from the gas orifice without being previously mixed with air, and consequently a luminous flame is produced. The conditions under which this flame burns are extremely unfavorable for the attainment of the complete combustion of the gas, because, not only is the access of air to the flame extremely restricted, but the flame is also surrounded by cold surfaces, and is extinguished by contact with them before complete combustion can take place. The combustion has, however, proceeded to a point at which the decomposition of the hydrocarbons has begun, and as one of the first steps in this decomposition is the formation of acetylene, C_2H_2, the products of the arrested combustion contain an appreciable percentage of acetylene, and it is to this gas that is due the distinctive odor noticed whenever an atmospheric flame is allowed to burn after having lighted back. The products of this arrested combustion also contain carbon monoxide and are therefore poisonous.

Use of Bunsen Flame

262. Why are Bunsen or atmospheric burners used in gas cooking stoves and incandescent gas lights? Why are they not used in the ordinary cylindrical gas heating stoves and gas radiators?

Ans. Atmospheric burners are used in gas cooking stoves principally because the flames from such burners will not deposit soot upon the bottom of the cooking utensils when these utensils come in contact with the flame, as may frequently happen. Any such contact between the bottom of a comparatively cold kettle or pot and a luminous flame will result in the setting free of a quantity of carbon in the form of soot, of which part will stick to the pot and part will go off as smoke. Even if actual contact does not take place, the supply of air may become deficient when the top of the stove is covered with pots, and in this case, also, the luminous flame would smoke. As the flame of the atmospheric burner does not need to draw as much oxygen from the atmosphere at the point of ignition as the luminous flame (since from one-third to one-half of the total amount required is already mixed with the gas) the combustion is more apt to be complete under such conditions, while even if it is incomplete no smoke will be given off from the flame.

The same reason holds for the use of the atmospheric burner for heating the mantles of incandescent gas lights. According to Prof. Lewes, carbon is deposited upon these mantles when the volume of air mixed with a 16-candle coal gas is less than 2.2 times that of the gas. This ratio varies, of course, with the quality and character of the gas.

In the ordinary cylindrical heating stoves and gas radiators there is no danger of contact between the flames and any cold surfaces, and the air supply can always be satisfactorily arranged so as to produce complete combustion of the gas. There is, therefore, no danger of the formation of smoke from the luminous flame, and no choice between the luminous flame burner and the atmospheric burner on this ground. The amount of heat produced by the consumption of equal amounts of any gas is the same whether the gas is consumed in atmospheric or luminous burners, provided the combustion is complete in each case. There is thus no advantage to be derived from the use of the atmospheric burner in these appliances, and the luminous burner is adopted as being simpler, more cheerful looking, capable of giving off more radiant heat, and not liable to lighting back, with its accompaniment of incomplete combustion.

Difference Between Incandescent and Luminous Burner

263. How does an incandescent burner differ from a luminous flame burner in the manner in which the light is produced from the gas, and how do you account for the difference in the amount of light which can be obtained from a cubic foot of gas by the two classes of burners?

Ans. An incandescent gas burner differs from a luminous flame burner in the way in which the heat produced by the combustion of the gas is transformed into light. As has been told in a previous answer, in a luminous flame the heat decomposes the hydrocarbons in the gas, forming particles of carbon, which it then raises to incandescence before they are consumed, and the light is given out by these incandescent carbon particles. The incandescent gas burner consumes the gas with a non-luminous flame in which there is no decomposition of the hydrocarbons, and the heat produced is employed to raise to incandescence a foreign body introduced into the flame.

The difference between the amounts of light produced per cubic foot of gas by the two styles of burners is thought to be due to two principal causes. In the first place the substances of which the best incandescent bodies are made, namely, thoria and ceria, in the proportion of from 98 per cent to 99 per cent of thoria to from 2 per cent to 1 per cent of ceria, convert a larger proportion of the heat into light by converting the heat into the light rays which yield the greatest illuminating effect for the smallest expenditure of energy, that is, those forming the portion of the spectrum in and around the green, while the carbon particles in the luminous flame give off principally rays falling in the red and yellow portions of the spectrum, the lighting value of which is comparatively low.

Advantages Obtained

In addition to this advantage it is thought that the temperature of the mantle is raised to a higher point than could be obtained solely from the heating effect of the flame from gas burning in air, by reason of catalytic action on the part of the ceria present.

(Forty-ninth Installment Next Week)

LABOR-SAVING EQUIPMENT

(Continued from page 1242)

Breaking Through Pavement

When improved paving is to be broken, a compressor outfit precedes the trencher and cuts the paving and concrete. In this manner the mechanical equipment is made to supply the wants of many gangs in different districts.

In one city in the Middle West which I have visited the records for several years past indicate that trenching and backfilling machines travel about nine to ten miles for every mile that is trenched or backfilled. The average traveling speed of these machines from job to job seldom exceeds one mile per hour. Consequently, the importance of carefully routing the work to cut down to a minimum the moves between jobs will be appreciated.

Much of the labor-saving equipment now on the market has been designed and successfully operated for contractors' work. Contractors' work and public utility work are vastly different, and what will answer the purpose of one will not necessarily fulfill all the requirements of the other.

Special Needs of the Utility Companies

Manufacturers of equipment are commencing to appreciate the requirement of the public utility companies, and machines of smaller overall dimensions, but ample strength and capacity, are being developed. Gas companies doing sufficient work to warrant the use of mechanical equipment should indicate to manufacturers their interest in the kind of equipment that they can use to advantage and help with this development.

In the beginning, at least, the factor of efficiency, as well as of economy, should be applied to the question of "Shall we buy mechanical equipment?"

Portable Air Compressors

The most generally used equipment on gas distribution work at the present time are probably portable air compressors, with their complement of pneumatic tools purchased originally for testing the joints of new mains laid with air. The uses to which such outfits could be applied have multiplied rapidly.

At present complete and really portable air compressor equipments mounted on trucks and provided with pneumatic tools for caulking, rock drilling, asphalt cutting, concrete breaking, tunneling and ramming of the backfill in the trenches are in general use by many progressive utility companies. These outfits are routed from job to job as needed and are not economical, but are indispensable to companies that consider efficiency of paramount importance.

By this means the trenching across the driveway of a merchant or the excavation at an important traffic intersection is quickly and unobtrusively completed and the trench refilled and rammed with the air rammers in much less time and with a minimum of inconvenience to the abutting property owners.

In the winter, when the frost has penetrated to a considerable depth, a leaking main or service, when discovered, means many hours of work before a sufficient excavation can be made by hand to effect a repair. With the pneumatic tool equipment it is the work of but an hour or two at the most to excavate to the leak under any frost conditions, and the repair can then be more readily made because the gangs are not exhausted with their excavation labors.

Excavating in paved streets presents no difficulties or delays in the work when pneumatic paving cutters and concrete breakers are available for use.

Many new uses for air are being developed and the future will no doubt provide additional tools for use with these equipments. Considering the general adaptability of these air compressor equipments, it is difficult to understand how utility companies doing any quantity of construction work can afford to be without them.

Trenching Machines

Trenching machines are perhaps next in importance to the compressor equipments for general application to gas company work. Their uses are not so diversified, but they do replace a large number of laborers. The number replaced is somewhat dependent on the character of the soil and the depth and width of the trench to be excavated. As the soil becomes harder and the digging deeper, the machine very rapidly gains in its advantage over hand labor.

In one situation, of which I have information, and where the normal excavation is to a depth of six feet, it is estimated that a machine replaces about seventy men.

A gas company, considering the use of a trenching machine, should have at least five miles of main to lay during an average year and a general character of soil that would permit a machine to be successfully used on at least this amount of trench. The individual main jobs should average at least two hundred feet each, as it is doubtful if trenching machine moves can be profitably made for shorter jobs than this.

With proper soil and a sufficient amount of main to be laid, a trenching machine is both economical and efficient.

The Types of Trenching Machines

There are now on the market three distinct types of trenching machines, which are as follows: wheel type, ladder type and vertical boom type.

The wheel and ladder types are large machines supplied in various sizes and capable of a wide range of digging widths and depths. Generally speaking, these machines can only be used with the maximum degree of success in new developments where the streets are wide and where there are no difficulties

to be encountered due to overall dimensions of the machines. These types are usually unsuited for the shallow and narrower ditch, which represents the average gas company requirement for a trencher in suburban extension work in this section of the country.

There are several modified wheel type of trenchers that are smaller and lighter, which from their description and as pictured seem to be ideally fitted for gas company's small extension work. Unfortunately, there is practically no authentic record of the performance of these machines as yet, and it is questionable whether they will operate successfully in anything but soft soil.

Vertical Boom Type of Trencher

The vertical boom type of ditcher has been designed especially for gas and water company work. It is limited to a comparatively narrow ditch approximately 18 inches wide and a maximum digging depth of five feet. These specifications meet the requirements of probably 90 per cent of the gas company trenching in this vicinity.

Where I have seen this type of machine in operation it has been reasonably successful, but structural weakness has in many cases limited its accomplishment.

The failure of a trenching machine at a critical time is frequently very disorganizing. The hand labor, to prosecute the work when the machine breaks down, is in many cases not available. Repairs, when new parts are necessary, require considerable time, and this idle time of the machine stands obtrusively in the mind of the gas company management as an indication of inefficiency.

I believe that with all of the difficulties that have been encountered with every type of machine, and with all of the seemingly disorganizing delays there is still much to be said of the advantages of trenching with machinery.

I know of one far-sighted and progressive company that is committed to the policy of making trenching machines work in their territory. The soil in this particular section is by no means ideal and their main work consists largely of short new business extensions. They purchased a trenching machine early in 1923, and their record of the use of this machine during that year reads "black enough to discourage the most optimistic of machine advocates." However, when at the end of the year all costs were computed, it was found that an appreciable amount of money had been saved over hand work. This saving was shown after considering all charges that could be justly attributed to the machine.

Costs of Work

To attempt to quote costs of trenching machine work, as compared with hand labor, is very misleading unless the methods of accounting and the kind of soil conditions are accurately known. It is, I believe, sufficient to say that savings are being accomplished. Some are great, some comparatively small, but there is apparently always a saving to be effected if there is "sufficient volume of work."

It is well to remember that trenching machine manufacturers will build a machine for gas company work embodying what we consider as our necessary specifications when there is a sufficient demand from these companies to make the merchandising of such a machine a profitable venture.

Backfilling Machines

Backfilling machines, which consist of a caterpillar tractor, boom, drag line and scraper, are great labor savers in the refilling of trenches, provided it is not necessary to ram the refill.

Tractors with scoops or plows attached, and even horse-drawn scrapers are economical when they can be used to a sufficient extent. All of these specialties, however, are of little value if the trench that is to be refilled is to be rammed and not puddled with water.

There seems to be an objection by many towns and municipalities to puddled ditches and the specifications for trench work made by many regulatory bodies require all ditches to be rammed.

There are unquestionably locations where nothing but ramming should be permitted, but there are many other places, and I am sure they are in the majority, where a better finished trench could be obtained with less probability of future settlement by the use of water and puddling. Where puddling with water can be done, the backfilling machines are a very economical means of refilling trenches.

Puddling Method of Ditch Filling

Some companies in the Middle West that puddle all of their ditches have an arrangement with the city for the payment of a flat rate per foot of main laid to cover the cost of the water used for the puddling. In other cities a water meter is connected to a fire plug by the gas company whenever water is to be used and a payment on the basis of this meter reading is made.

I believe greater advantage could be taken of the use of labor-saving devices for backfilling if gas companies, generally, would give more consideration to this puddling method of refilling trenches and use their influence to have this practice sanctioned by state or municipal authority.

Other Labor-Saving Machines

Power tampers are made by at least one concern, but they have never enjoyed extensive use. They have been used on certain classes of work with varying degrees of success, but it is doubtful if the average gas company would find either economy or efficiency in their use.

Caterpillar and truck cranes are a great advan-

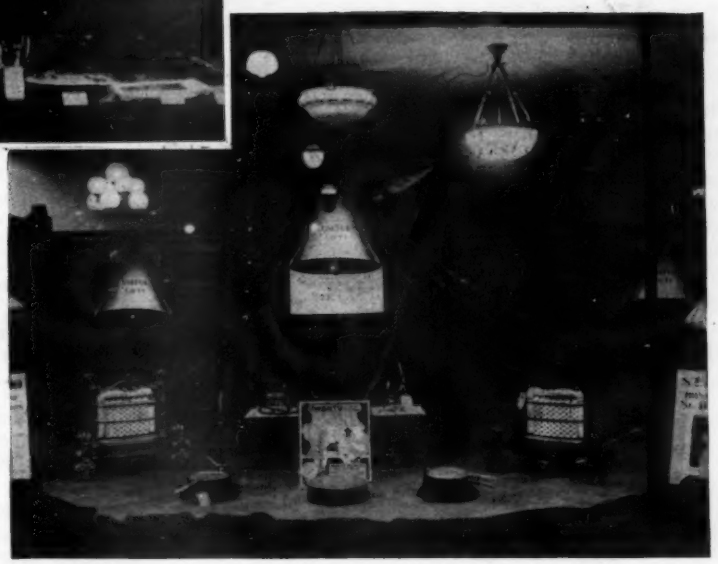
(Continued on page 1256)

GAS HEATERS AND RANGES FOR CHRISTMAS

(Continued from page 1241)

the radiants to intense incandescence. Glowing cheerfully, these radiants throw off radiant heat—just the same kind of heat which the sun sends through 90,000,000 miles of frigid space to warm the earth.

A Window Display Featuring the Warmth Pervading a Room from a Gas Heater, Blackstone Valley Gas Co., Pawtucket, R. I.



The Small Gas Appliance in a Christmas Window Display, Newark Gas & Electric Co., Newark, N. J.

A GIFT THAT'S WARMLY APPRECIATED

Providing, as it does, a rare combination of usefulness and beauty, it is a splendid Christmas gift for one whom you hold especially dear. It is a gift of warmth—a gift of thoughtfulness—a gift of good cheer—a gift for the entire family.

BUY A GAS HEATER NOW—PAY FOR IT AFTER CHRISTMAS

In consideration of the many expenses coming at this time of the year, special arrangements have been made whereby you can obtain a gas heater and enjoy it immediately—but without having to pay for it until after Christmas.

The unusual consideration shown by the company in making this last offer resulted in many orders for the cheerful gas heaters, which were paid for without difficulty once the holiday drain on the pocket was over.

Community Holiday Openings

In several sections there are community holiday openings and one of the most successful was in Pawtucket, R. I., where the Merchants Division of the Chamber of Commerce promoted such an opening. With 114 entrants, the first prize for effective display was won by the Blackstone Valley Gas Co., with their window "The Cosiest Room in the House," wherein a gas radiant fire was displayed in a fireplace setting.

In speaking of the success achieved by them, F. C. Eteson, of the gas company, said: "I cannot emphasize too strongly the value of show windows, and the enhancing of the value of displays by placing all appliances in the proper setting. The show windows have been recently overhauled, and

the very latest lighting equipment and background hangings installed. The money thus spent to afford the natural settings for all displayed material has been a worth-while investment to the company.

Gas Employees Decorated Windows

"The fact that employees from our own company decorated the winning windows (we secured a third prize as well as a first) shows that many firms

A Convenient Christmas and a Healthy New Year!

Here's a gift for everybody to use and enjoy. What greater comfort can the home possess than a ready supply of hot water at every tap, upstairs and down? It's an unequaled convenience and of health benefit, too, because more frequent bathing is encouraged.

There's just time to get a

Gas Water Heater

installed for Christmas

Easy Terms and expert assistance in choosing just the right type of heater for your home and requirements. Come in this week SURE. Time is limited.

(Your Name and Address)

"You can do it Better with GAS"

A.G.A.-350

A Christmas Gas Ad.

might follow our example without necessarily hiring expert display men. One hundred and five stores, representing widely diverse lines, joined in the contest. By the rules of the contest, living models were barred; mechanical devices were permitted, yet none were used. The windows won the prizes solely on richness of merchandise, artistic arrangement, advertising and sales value, color scheme, originality and general attractiveness.

Public Interested

One element to be considered in the final decision was that of interest displayed by the general public. Lighting effects were permitted, and that all might share equally in the use of apparatus the local electric company offered the free use of its spot lights, color lenses and similar equipment. It was this lighting which added the finishing touch to many windows, and those which won both first and second prizes were strikingly illuminated. A 500 candle spot light was used by us in the winning window, and its rays were focused on a central figure of a baby playing with blocks in the center of a beautiful room. A gas fire in a rich mahogany fireplace with its golden glow (secured partly by a well focused orange colored light) added the touch of coziness. The idea of the gas-heated room where a child could play in comfort not only attracted the greatest number of spectators, but the window actually had a big sales value, as well as originality and artistic merit."

Featuring Small Appliances

The Newark Gas and Electric Co., Newark, N. J., had a holiday display that featured not only gas heaters and lamps, but many small table appliances. Dome lights were employed, and in the rear was a panel hung with dark green velvet, from which was suspended a big cardboard bell. Two bells of similar size were suspended from the ceiling at each side and upon all of them was printed, "Useful Gifts." A card fastened to the panel advised "Gas Appliances as gifts are sure to be appreciated because their use means improved service and gain in comfort for the home." Ropes of red and green extended from the central bell to various gas appliances spread out on the floor, which included gas heaters, irons, grills, waffle irons and toasters.

THE REACTIVITY OF COKED FUELS

In a long description of researches on this subject, spread over four numbers (June, July, August and September), of the "Bulletin Mensuel" of the Swiss Gas Association, Dr. A. Rosli gave a detailed account of some most interesting work. He showed how he had studied the behaviour of coked fuels, under heat at slowly rising, and at high constant, temperatures, determining the volumes and compositions of such gases as were given off. He was able to demonstrate how the individual elements of the combustible constituents behave; and his experiments satisfied him that coked fuels, which, however, still contained gaseous matter, could be completely cleared of this at relatively low temperatures—1000 deg. C., for example. The course of the gasification and the composition of the gases depended upon the nature and manner of the heating. It was shown that gases produced when the coking period was long seldom contained more than 10 per cent by volume of nitrogen, and that, therefore, the high nitrogen percentages attributed in current literature to this cause are more likely due to the intrusion of air into ovens.

INDUSTRIAL GAS AT THE CROSS ROADS

(Continued from page 1240)

pleasant if this were going to happen, but all our past experience points to exactly the opposite. Factory productive capacity in this country has, for the first time in our history, outstripped consumption, and with capital charges and "overhead" prodding relentlessly from behind and with an intermittently saturated market lying ahead, the course of business will inevitably result in further fluctuations of feverish activity followed by profound quiet.

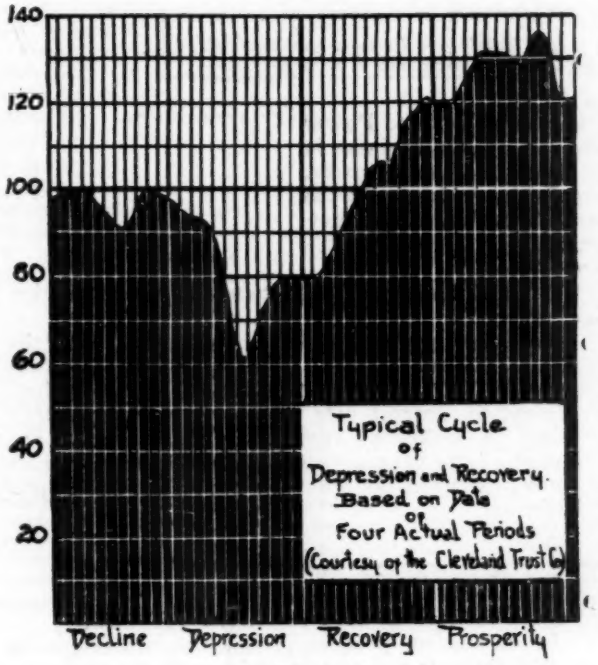


Fig. 3

The Composite of Four Great Crises of American Business

(Reproduced by kind permission from "Business Recovery Following Depression," By Mr. Leonard P. Ayres, V. P., The Cleveland Trust Co.)

The Business Cycle

A business cycle consists of four phases: prosperity, decline, depression and recovery. Figure 3, reproduced by courtesy of Col. Ayres, shows a composite of the four major crises of business before this country entered into the Great War. It is the average of the four depressions of 1883-86, 1903-04, 1907-08 and 1914-15. It may be translated with equal accuracy, from general business into sales of industrial gas, and it shows what may happen every so often to the gas company's revenue when industrial sales have become the predominant part of its total business.

The high peak at 136 per cent of normal is more than twice the low point of 60 per cent. Conversely, how burdensome are interest and other capital charges going to be when plant capacity, built for 126, is only running at 60?

Demand Rates the Solution

How, then, may these great fluctuations, coming as they do on top of the seasonal, daily and hourly variations, be confined to output and not be translated into dollars and cents? By only one method: the adoption of a sound rate structure based upon at least a two-part charge. The electrical industry, confronted by the same difficulty, has solved the problem, to a great extent, by the institution of the demand rate in addition to the commodity charge. How far this has succeeded will be seen from Figure 4, which shows the relation between the sales of the factory power of Figure 1 and the revenue resulting therefrom, and the sales and revenue from the industrial gas in the same picture. The quantities are plotted logarithmically, so that lines having the same slant show the same proportionate growth or loss. Note the contrasts between the upper line of revenue, the kilowatt hour sales below it, and the marked fluctuations of the industrial gas sales at the bottom. At the same time, the curve of electrical revenue, while much flatter than that of the corresponding kilowatt hours sold, is not entirely even. It shows that even the electric companies are by no means immune from the vicissitudes of modern industry, because even a two-part rate will be affected to some extent. It is in addition partly due to the monthly demand adjustment on some of the rates. Were the demand based on connected load, and adjusted annually or even semi-annually, a still greater evenness would be apparent.

An Instructive Comparison

A comparison of some of the principal variations emphasizes this point:

Electricity

Period	Sales Kwh.	Revenue $
Jan., 1922, to Nov., 1922, Increase..	80%	50%
Feb., 1923, to May, 1923, Increase..	17%	14%
Mar., 1924, to July, 1924, Decrease	26%	15%

Gas

Period	Sales M	Revenue $
Aug., 1922, to Nov., 1922, Increase..	43%	*43%
Oct., 1923, to March, 1924, Increase	23½%	23½%
Mar., 1924, to Aug., 1924, Decrease	38%	34%

*Note: Making allowance for a reduction of 5c in rates.

It is evident, therefore, that sales of industrial gas are not going to be steady, constant loads, and that, as this business develops, there are going to be recurring periods when a large part of the gas plant will be idle. It is also evident that unless a

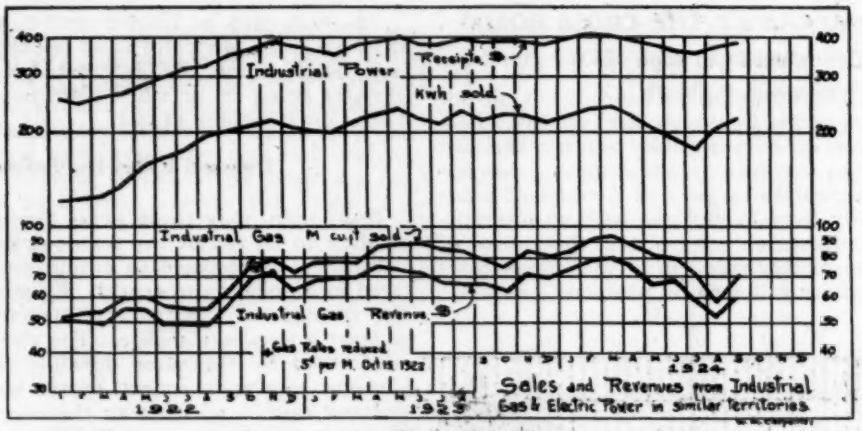


Fig. 4
Sales and Revenues from Industrial Gas and Power
(The effect of the acquisition of new business is shown here and serves to accentuate the increases, while apparently mitigating the depressions. As the volume of business increases, however, this factor will become of less importance.)

rate is evolved which will equalize in some way the fluctuations in sales, increasingly irregular gross and net earnings will result. This can only be avoided by introducing into the rate a factor which is independent of the price of gas. Furthermore, a demand factor in the gas rate will, by absorbing a large proportion of the fixed costs, permit of the establishment of a lower commodity charge which will be of tremendous assistance in the acquisition of new business.

Industrial gas is, therefore, confronted with the same problems which industrial electricity has faced. Will it solve these by the adoption of a fundamentally correct rate structure, or will it drift along on makeshift commodity charges until the trough of the next severe industrial depression once more points out the "marginal" nature of this new business?

(Continued from page 1252)

tage on large main jobs and special work, but the initial cost and probably infrequent occasion for use bar them from any except the larger companies.

It is well, however, to remember that equipment of this general character is in constant use by contractors and that it is possible to rent such equipment for temporary use. When there is work on which such outfits can be used it would be well to consider obtaining them on a rental basis.

In conclusion, I would like to give the gas companies a thought for their consideration on the subject of labor-saving equipment, and it is this—Don't expect too much saving, give thought to the efficiencies and remember that what others are doing can be done by you.

Local conditions are different and so is the soil, but no company that is wisely managed can afford to dismiss this subject without due consideration unless they are willing to assume the burden of proof for such action.

COMBINED GAS MAKING PROCESS

In distillation processes in which water-gas is passed through a retort in which carbonaceous material is distilled, an increased yield of gas is obtained by using the blow gas which is formed in the water-gas production. Bituminous coal is distilled in a retort by means of the sensible heat of water-gas produced from the resulting coke. The producer is run in such a way during the blow period that the blow gas, instead of consisting of carbon dioxide and nitrogen, consists of carbon monoxide, hydrogen, nitrogen and a small percentage of carbon dioxide. This blow gas may be used in the manufacture of hydrogen simultaneously with the distillation process, by passing it through a container filled with heated iron oxide. The oxide is reduced to iron, and superheated steam is then blown through it whereby hydrogen is liberated. The steam may be superheated in chequerwork brick chambers, in which the residual blow gas is burnt after being used for reduction purposes. The hydrogen thus obtained is mixed with the combined retort and water-gas after tar oils, etc., have been removed from the latter.—(British Patent No. 220,676.)

Current Market Prices

COALS (By Courtesy of Coal Age)
A. Bituminous.

(Spot prices, F. O. B., mines, net tons).

High Volatile, Eastern	Market	Price
Pool 54-64 (Gas Standard)	New York	$1.40 to $1.65
Pittsburgh screened gas	Pittsburgh	2.30 to 2.50
Pittsburgh gas, mine run	Pittsburgh	2.00 to 2.25
Kanawha lump	Columbus	2.10 to 2.50
Kanawha mine run	Columbus	1.40 to 1.75
West Virginia lump	Cincinnati	2.75 to 3.00
W. Virginia gas mine run	Cincinnati	1.30 to 1.60
Midwest		
Indiana 4th vein lump	Chicago	3.00 to 3.25
Indiana 4th vein mine run	Chicago	2.25 to 2.50
South and Southwest		
Big Seam lump	Birmingham	2.75 to 3.50
Big Seam mine run	Birmingham	1.50 to 1.90
Southeast Kentucky lump	Louisville	2.75 to 3.25
Southeast Kentucky mine run	Louisville	1.50 to 1.75

B. Anthracite.

(Spot prices F. O. B. mines, gross tons).

	Market	Freight rates	Independent	Company
Egg	New York	$2.34	$8.50 to $9.00	$8.75 to $9.25
Egg	Philadelphia	2.39	9.45 to 9.75	8.80 to 9.25
Egg	Chicago (net tons)	5.06	8.17 to 8.25	8.14 to 8.20

COKE (By Courtesy of Iron Trade Review).

Connellsville, furnace	$3.00 to $3.25
Wise County, furnace	3.75 to 4.00
Alabama, furnace	4.50 to 5.00
Foundry, Newark, N. J., del.	10.41
Foundry, Chicago, ovens	10.75
Foundry, Boston, delivered	11.50
Foundry, St. Louis	11.00
Foundry, Granite City, Ill.	9.00
Foundry, Alabama	4.50 to 5.00

PETROLEUM (By Courtesy of Oil, Paint & Drug Reporter)

(Prices at wells, per bbl.)

Pennsylvania—Ohio—West Virginia.	
Cabell, West Virginia	1.45
Corning, Ohio	1.50
Lima	1.56
Pennsylvania	$2.75 to 2.85
Wooster, Ohio	1.40
Indiana—Illinois.	
Illinois	1.37
Indiana	1.38
Oklahoma—Kansas.	
Mid-continent (low gravity)	.75
Gulf Coast.	
Gulf Coast, Grade A	$1.50
Gulf Coast, Grade B	1.25

GAS OILS.

Gas Oil, Bayonne, bulk gal.	5 to 5¼c
Gas Oil (32-36) Oklahoma, gal.	2¾ to 3 c
Gas Oil (32-36) Gulf Coast, gal	3¾ to 4 c

PIPE AND FITTINGS—CAST IRON GAS PIPE.

(By Courtesy Iron Trade Review.)

Four-inch, Chicago	$56.20 to $57.20
Six-inch and over, Chicago	52.20 to 53.20
Four-inch, Birmingham	52.00 to 53.00
Six-inch and over, Birmingham	48.00 to 49.00
Four-inch, New York	65.50 to 66.50
Six-inch and over, New York	60.50 to 61.50
Standard fittings, Birmingham, base	115.00

6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20.

BY-PRODUCTS

(By Courtesy of Oil, Paint and Drug

Ammonia aqua, 16 deg. drums lb.	5 to 5¼c
Ammonia aqua, 20 deg. drums lb.	6¼ to 6½c
Ammonia aqua, 26 deg. drums lb.	6½ to 7 c
Ammonia squa, anhydrous cylinder, lb.	30 to 36 c
Ammonium sulphate, bulk F. O B. Works, per 100 lbs.	$2.70 to $2.80
Potash prussiate, yellow casks, lb.	16½ to 16¾c
Potash prussiate, red casks, lb	37 to 38 c
Soda prussiate, yellow casks,	9¼ to 9¾c
Soda sulphocyanide, barrels, lb.	45 to 55 c

COAL TAR BASIC PRODUCTS.

(By Courtesy of Oil, Paint and Drug Reporter)

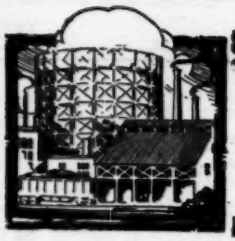
Benzol C. P. tanks, works, gal.	24 to 25c
Benzol, drums, gal.	30c
Benzol, 90% tanks, works, gal.	23c
Benzol, 90% drums, gal.	28c
Napthalene, flake, barrels, lb.	5½ to 6 c
Napthalene, dyestuff bags, lb.	5 to 5½c
Solvent Naphtha, water white works, gal.	24 to 25c
Solvent Naphtha, drums, works, gal.	29 to 30c
Toluene, C. P. tanks, works, gal.	31c
Toluene C. P. drums, works, gal.	36c

Coal

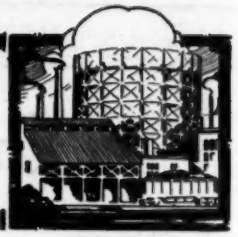
There is not much change in the daily rate of production of bituminous coal, for although the total output for the week ending November 22, according to the Geological Survey, was 10,588,000 net tons, an increase of 459,000 tons over the preceding week, the lower figure for that week was due to the partial observance of Armistice Day. It is interesting to note, however, that this is the second time that output has exceeded that of the corresponding week of 1923. Anthracite production in the week ended November 22 totaled 1,827,000 net tons, compared with 1,674,000 tons in the previous week and 2,031,000 tons in the corresponding week of last year. Local strikes have been limiting output in the hard coal region.

Crude Oil

Crude oil production continued to gain during the week ended November 22, according to the American Petroleum Institute, a gain of 22,550 barrels daily being indicated. According tor the Institute, daily average production for the week totaled 1,963,600 barrels, as compared with 1,941,050 barrels for the preceding week.



NEWS OF THE GAS INDUSTRY



GAS LEADERS CHOOSE OHIO FOR LABORATORY

Pick Cleveland as Place to Test Heating Appliances

Cleveland, O. — Cleveland has been selected by the American Gas Association as the home of its national laboratory, according to an announcement from association headquarters, made public through the Ohio Committee on Public Utility Information. A number of other cities, including New York, were considered, but the committee in charge finally decided that conditions in the manufactured and natural gas industry in Ohio and the wide variety of gases available made Cleveland the most favorable for experimental work.

To Protect Public

The purpose of the laboratory, as stated by the association, is to establish a standard for the testing of gas appliances and their operation as a means of protecting the public from the sale of inefficient and poorly constructed equipment. Every type of gas appliance on the market will be submitted for test to the laboratory. This may be followed by a nation-wide educational campaign to instruct gas consumers in the installation and use of gas burning apparatus.

According to the gas association, the continued sale of shoddy appliances, cheaply built and inadequately designed, has done incalculable harm to the industry, and a way has long been sought to correct this evil.

The answer was a testing laboratory, conducted by the best available chemists and gas engineers which, supported by gas companies and appliance manufacturers, would be the recognized authority for all technical matters. Co-operating with the laboratory will be the United States Bureau of Mines, Standards and Public Health.

Means Big Saving

Appliances will be tested under every possible condition with a view to discovering some formula whereby a range or heater can be regulated in advance of its installation to meet different conditions of gravity, pressure and heating value in a given field. Incalculable savings, running up into the millions, could be made in the manufacture of appliances by using such a formula to test burners at the factory, it was estimated.

Among the minor advantages which it is hoped will result from the establishment of a laboratory is the elimination of confusing and ofttimes contradictory local ordinances dealing with the specifications of gas appliances. With a national standard in existence the need for such ordinances will automatically disappear.

Association Activities Under Way

New York, N. Y.—Activities of the various sections of the American Gas Association under the general leadership of H. C. Abell, president, have already taken definite form and the year ahead promises to be one of the most constructive in the history of the association.

At a recent dinner, held at the Engineers Club, and attended by the chairman and vice-chairman of each section, as well as President Abell and Secretary-Manager Alexander Forward, detailed plans were made for the handling of association work. At this dinner meeting each section chairman explained what his sectional work was to be for the coming year, and a general discussion followed. Previous and following this dinner meeting, all sections had organization meetings of their managing committees, with the exception of the Publicity and Advertising section, which holds its meeting Tuesday, December 2.

In his address to the officials of the sections, President Abell made many constructive suggestions, one of them being that the association would do well to concentrate its major efforts on activities of first importance to the entire industry.

Malone Light & Power Schedule Approved

Albany, N. Y.—The Public Service Commission has approved a schedule for gas service supplied by the Malone Light & Power Co. for gas supplied in the village of Malone, N. Y., effective November 29, 1924. Classification provides step rates as follows for use of service for lighting and fuel for limited period (six months from October meter reading to April meter reading each year) will be cancelled: For monthly consumption of 30,000 cu. ft. or less, 17c per 100 cu. ft.; more than 30,000 cu. ft. but not more than 50,000 cu. ft., 16c per 100 cu. ft.; more than 50,000 cu. ft., 15c per 100 cu. ft. Minimum charge, $35 per month. Regular meter block rates will apply.

Artificial Gas Replaces Natural at Conneaut

Northwestern Oil & Gas Company has been authorized to substitute artificial gas for natural gas service in Conneaut, North Kingsville and the townships of Ashtabula, Kingsville and Conneaut, in Ashtabula County, by the Utilities Commission.

Natural Gas Co. Turns to Manufactured Gas

Piedmont, W. Va.—The Piedmont City Council has granted the request of the West Virginia and Maryland Gas Company for a modification of its franchise to permit them to furnish artificial gas, or a mixture of artificial and natural gas, as well as natural gas, to their consumers in Piedmont.

Seeks Franchise for Gas Service in Hackettstown

Philipsburg, Pa. — Application has been made to the Hackettstown Common Council for a franchise to operate a gas service at that place. The applicant was A. L. Hatfield, senior member of the Hatfield Rubber Company, whose place is two miles from Hackettstown. The request for a franchise met with the hearty approval of the town officials and steps were taken to comply with the request of Mr. Hatfield.

Rochester Gas Co. Gets New Rates

Albany, N. Y.—The Public Service Commission has approved rates of the Rochester Gas & Electric Corporation for gas service supplied in the city of Rochester, villages of East Rochester, Fairport and Pittsford, and towns of Chili, Gates, Greece, Irondequoit, Penfield, Perinton and Pittsford, N. Y. New classification provides rate of 45 cents per thousand cubic feet for continuous mixed coal and carburetted blue gas; available to any customer who will pay cost of service extension from the Smith Street Gas Works to customer's plan and who will guarantee a minimum consumption of 5,000,000 cubic feet per month. This rate is based on cost of oil at 7 cents per gallon and gas coal at $5.50 per net ton, f. o. b. cars Rochester, and is subject to increase or decrease of one-half cent per thousand cubic feet for each one-half cent increase or decrease per gallon in cost of oil, and increase or decrease of 1 cent per thousand cubic feet for each 18 cents per ton increase or decrease in cost of gas coal.

Public Service Company Takes Option to Buy Boulder Gas Company

Boulder, Colo. — The Public Service Company of Colorado has secured an option to purchase the Federal Gas Company here, and is expected to assume management of the company January 1. The entire preferred and common stock of the Federal Gas Company will be bought, it is reported. No mention of a cash consideration was made public here.

The Federal Gas Company was organized in 1901. The last inventory of the company's property placed a valuation of $375,000 on it. Harry B. McClure is president of the Federal company, which has 2,400 customers, maintains 27 miles of gas mains and supplies this city with gas.

The management of the company after January 1 will be directed from the Denver offices of the Public Service Company.

Billings, Mont., Gas Rate Increased

Billings, Mont. — Increase in gas rates in Billings and vicinity, amounting to about 4½ per cent, in the opinion of city and gas company officials, has been granted by the State Public Service Commission. The increase is 12½ cents per 1,000 cubic feet on the first 2,000 cubic feet of gas used and 2 cents per 1,000 cubic feet on the next 98,000 cubic feet used. Above that amount the increase is slightly less. The minimum is increased from $1 to $1.25, but the 10 per cent penalty, heretofore imposed for non-payment before the 10th day of the following month, is removed by the commission.

The new rates are as follows:

First 2,000 cubic feet at 62½ cents per 1,000 cubic feet.
Next 98,000 cubic feet at 52 cents per 1,000 cubic feet.
Next 100,000 cubic feet at 47 cents per 1,000 cubic feet.
Next 100,000 cubic feet at 42 cents per 1,000 cubic feet.
Next 100,000 cubic feet at 37 cents per 1,000 cubic feet.
Next 100,000 cubic feet at 32 cents per 1,000 cubic feet.
Next 100,000 cubic feet at 27 cents per 1,000 cubic feet.
Next 400,000 cubic feet at 22 cents per 1,000 cubic feet.
Next 1,000,000 cubic feet at 17 cents per 1,000 cubic feet.

Gas Company Released from Receivership

Minneapolis, Minn. — Judge Booth, in United States District Court Thursday, ended the receivership of the Minneapolis Gas Light Company by signing an order which granted the petition of C. T. Jaffray and A. T. Rand for dismissal as receivers for the company. The ending of the receivership closes litigation of many years' standing between the city and company and followed the council's recent action in fixing a 98-cent rate as the basic price. Adjustments will be made each four months according to the costs of production.

In dismissing the receivership, the court approved the work of the receivers who have had charge of the company since January 26, 1920, and ordered all assets returned to the company and all accounts allowed. Debts of the company and financing of improvements have been met through a recent $2,000,000 bond issue.

Under the terms of the agreement with the city, the company is laying approximately three miles of gas mains each week in order to bring delayed extensions up to date.

M. M. Milton Named Gas Engineer

Richmond, Va.—Colonel Marshall M. Milton has accepted the post of gas engineer of the Department of Public Utilities.

Colonel Milton served in this capacity for two years under the former director of the department, E. W. Trafford, and resigned in December following a disagreement with his chief over the administration of the gas plant.

He was appointed by Director George H. Whitfield at the instance of the Mayor, who expressed confidence that Colonel Milton would be a valuable officer.

R. C. Congden, incumbent gas engineer, an appointee of Mr. Trafford, has resigned, effective November 15, when Colonel Milton takes office.

Among the first duties of the new officer will be to conduct a series of gas manufacturing tests upon which may rest the future gas production policy of the city, it is said. The post of gas works engineer is considered one of the most highly technical and vitally important of any in the gift of the administration.

Gas Companies Merged

Merger of five public utility companies in western Ohio, supplying gas service in Lima and other cities in that part of the state, was announced today.

The new company, which will be known as the West Ohio Gas Company, is under the management of Samuel Insull and associates. Mr. Insull is chairman of the company and E. R. Curtin of Lima has been elected president and is in active charge of the operation of the properties.

Other officers are:

Vice-president—Samuel Insull, Jr.

Assistant to the president—E. R. Curtin, Jr.

Treasurer—George F. Mitchell.

Secretary—W. D. Boone.

Assistant secretary and assistant treasurer—Frank L. Pringle.

Comptroller—W. A. Sauer.

The properties combined were operated by the Lima Natural Gas Co., the Lima Gas Light Co., the Wapakoneta Gas Co., the St. Mary's Gas Company and the Celina Gas Co. The Public Utilities Commission of Ohio has approved the purchase of these properties by the West Ohio Gas Co. for $3,126,230.

The commission also has authorized the issuance of $1,000,000 in first mortgage, 30-year, 6 per cent bonds, 7 per cent preferred stock with a par value of $750,000 and 75,000 shares of common stock of no par value.

Unregulated Municipal Plants Discriminate Against Patrons, Claims Commissioners' Report

Madison, Wis. — Fundamentally similar laws in all states of the nation governing the regulation of public utility rates, consolidations, security issues and providing for the inclusion of municipally-owned utilities within the jurisdiction of state commissions in order to safeguard the more than 50,000,000 users of public utility services, is declared necessary in the report of the National Association of Railroad and Utility Commissioners special committee on uniform regulatory laws.

Lewis E. Gettle, chairman of the Wisconsin Railroad Commission and chairman of the association's special committee, presented the report.

In recommending commission jurisdiction over municipally-owned plants, the report says:

"Municipal ownership in and of itself is no assurance against an unreasonable rate of return and the exaction of excessive rates from utility customers.

"Such, at least, has been the experience of the Wisconsin Commission.

"Indeed, the commission has found that there is not in all cases of municipally-owned and operated utilities, an absence of the attitude of the management towards the patrons of the utilities which is commonly attributed to corporation or private management.

"To illustrate: An analysis by the commission of the 1923 income accounts of Wisconsin electric utilities disclosed eleven cases in which existing rates were yielding an excess return, the total return approximating, in several instances, from 10 to 20 per cent of the fair value of the property.

"Nine of the eleven cases involved municipal plants, and the commission suggested to these municipal utilities the advisability of informal rate reductions. Several of the municipalities not only objected to a rate reduction, but assumed an almost belligerent attitude, and the institution of formal rate reduction proceedings on the commission's own motion became necessary.

"No doubt in these, as in other cases, city officials were averse to rate reductions for the reason that excess utility earnings are reflected in lower tax rates, which are popularly interpreted as evidence of administrative inefficiency. Had the utilities been privately owned, on the other hand, it is more than likely that these same city officials would have been active in instigating rate reductions. This experience contradicts the contentions of those who believe that municipal ownership, of itself, is an insurance against excessive return, and indicates that to prevent the exploitation of utility customers in favor of the taxpayer, state regulation of municipal utilities is necessary.

"'It is notorious that, when not subject to state regulation in matters involving financial and operating records, municipal utilities seldom keep such records as are needed for adjustment of rates.

"All public utility customers should have the same means of obtaining an adjustment of difficulties. The failure to include municipal utilities within the jurisdiction of a state commission amounts to the denial to patrons of such utilities the same means of redress of real or fancied grievances, as are available to patrons of privately owned plants."

Salina Gas Co. Improves Plant

Salina, Kansas—Extensive improvements at the gas plant of the Salina Light, Power & Gas Company, which will double the present gas producing capacity of the plant, are now under way, it has been announced by officials of the company.

Where heretofore the Salina Light, Power & Gas Company plant has been able to manufacture 250,000 cubic feet of gas per 24 hours, when the water gas system is installed the plant can produce 500,000, or half a million cubic feet of gas per day.

Large Industrial Gas Contracts Awarded

Paterson, N. J—Two unusually large contracts for gas to be used for industrial purposes have been awarded to Public Service Electric & Gas Company. One of these was signed by the Hyatt Bearings division of the General Motors Corporation, in Harrison, formerly the Hyatt Roller Bearing Company. The contract, based on the company's consumption of gas last year, will average about 7,500,000 cubic feet per month, which makes this concern the largest gas consumer in New Jersey.

The contract is for one year, during which period the company will discontinue the use of its private gas plant, which has been in operation about five years. If, at the end of the year, the company decides to continue its contract, it will abandon permanently its own plant. Gas is used by the Hyatt concern in heat treating the bearing parts used in automobiles and for other industrial purposes.